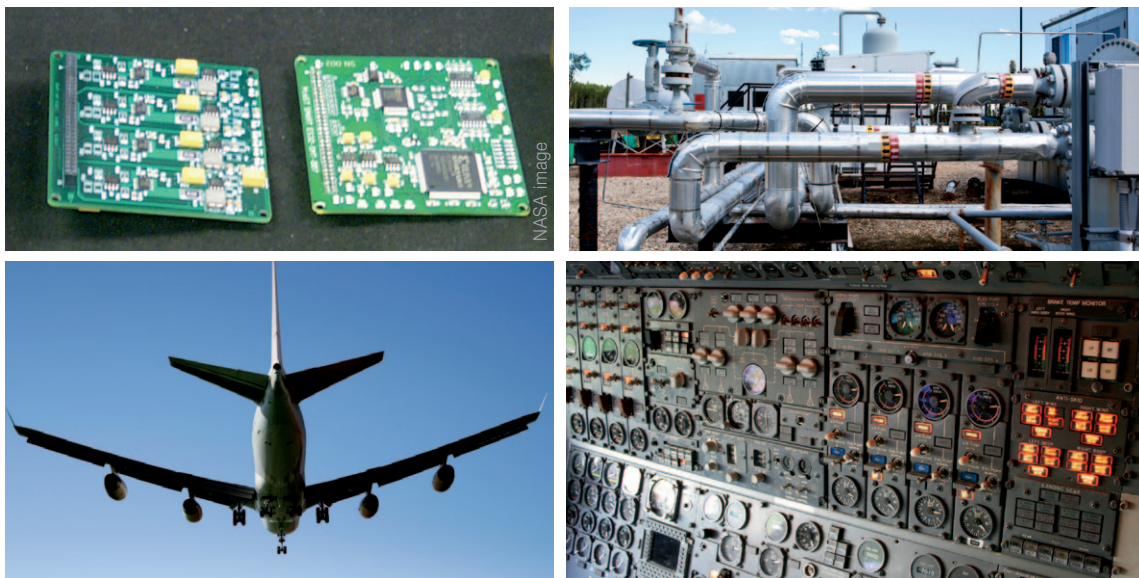


Sensors, Instrumentation, and Communications Technology

Standardized Multi-Purpose Avionics with Reconfigurable Technology Drive (SMART-D) Module



Innovators at NASA's Marshall Space Flight Center (MSFC) have developed a concept for a small, compact, multi-purpose avionics control and communications module with standard communication interfaces for RS485, wireless, RS232, Ethernet, and others. The Standardized Multi-Purpose Avionics with Reconfigurable Technology Drive (SMART-D) module is ideal for controlling avionics flight components, and it also can be reconfigured using software for new tasks in a mission timeline without the need to change the hardware. The module acts as a fundamental component in a distributed (versus centralized) control system.

Benefits

- **Reconfigurable:** Allows reuse of hardware rather than requiring module replacements with new hardware as requirements change
- **Compact:** Features a small form factor and enables co-location with sensors or actuators to reduce the amount of wiring needed and thus the total onboard non-payload mass
- **Streamlined:** Reduces workload and computing requirements on centralized command and data handling (C&DH) systems
- **Fast:** Enables faster system response because the local control does not require a response from a C&DH processor
- **Robust:** Reduces the potential for electro-magnetic interference (EMI) by reducing the amount of wiring needed
- **Efficient:** Reduces energy load by virtue of its small footprint, resulting in lower heating/cooling and operating current



For More Information

If you would like more information about this technology or about NASA's technology transfer program, please contact:

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The Technology

The SMART-D module is a small, distributed, standardized hardware device that can provide command and control functionality for multiple end-item avionics applications.

How it works

The module provides simple interfaces between systems with only communication and power lines connecting the module to the main avionics system. The module uses standard connections and can be reused for multiple missions. Functions can be added or changed late into system design for a given mission, and even during integration of the module, helping to reduce cost and schedule impact while enabling responsiveness to changing application needs.

Why it is better

The SMART-D module is flight qualified and can interface with drive components very early in the spacecraft development cycle, enabling software development and validation early to save time and eliminate the need for customization—a significant advantage over other avionics communication and control methods. The reconfigurable nature of the SMART-D technology enables repurposing of modules for many different applications beyond the initial use. In fact, unlike other technologies that must be customized for each application, the SMART-D module requires additional software development only in cases in which a new function is needed that has not already been developed for a previous application.

Patents

Marshall Space Flight Center has applied for patent protection for this technology.

Licensing & Partnering Opportunities

This technology is part of NASA's technology transfer program, which seeks to transfer technology into and out of NASA to benefit the space program and U.S. industry. NASA invites companies to inquire about licensing the SMART-D module (MFS-32842-1) for further development and commercial applications.

Potential Applications

- Aerospace, primarily onboard avionics in aircraft and spacecraft
- Ground-based industrial systems
- Commercial aviation
- Military aviation
- Remote sensing, including environmental monitoring and unmanned industrial equipment stations
- Refineries
- Equipment used for research in other highly specialized environments, such as clean rooms